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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Wen Gao

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IP DEPARTMENT
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EXAMINER

FINDLEY, CHRISTOPHER G

ART UNIT

PAPER NUMBER

2621

MAIL DATE

DELIVERY MODE

10/27/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,877	Applicant(s) GAO ET AL.	
	Examiner CHRISTOPHER FINDLEY	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☒ Claim(s) 4-6, 13, 14, 18-20 and 27-29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/21/2005</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 4-6, 13, 14, 18-20, and 27-29 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). In the interest of furthering prosecution, the claims listed above have been treated with prior art.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 4-6, and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Ramaswamy (US 20020163966 A1).

Re **claim 1**, Ramaswamy discloses performing a rate control method (Ramaswamy: Figs. 4A-4C), wherein parameters are calculated for a given macroblock (Ramaswamy: Fig. 4A, steps 420-430) and the quantization is adjusted accordingly (Ramaswamy: Fig. 4A, steps 432-436).

Re **claim 2**, Ramaswamy discloses that a buffer fullness value is determined from calculated macroblock parameters (Ramaswamy: Fig. 4A, steps 420-430).

Re **claim 4**, Ramaswamy discloses the claimed equations for bit allocation adjustment (Ramaswamy: equations 10, 11, and 12).

Re **claim 5**, Ramaswamy discloses the claimed equations for initializing the remaining bits of the GOP (Ramaswamy: equation 5).

Re **claim 6**, Ramaswamy discloses the claimed equations for initializing X_i , X_p and X_b (Ramaswamy: paragraph [0051] and equations 7, 8, and 9).

Re **claim 9**, Ramaswamy discloses that the quantization parameter is adjusted according to the macroblock activity and buffer status (Ramaswamy: Fig. 4A, steps 424, 426, 430, and 432-436).

Re **claim 10**, Ramaswamy discloses the claimed equation for calculating macroblock activity (Ramaswamy: equation 17).

Re **claim 11**, Ramaswamy discloses the claimed equations for calculating the macroblock quantization parameter (Ramaswamy: equations 17, 22, and 23; equations 19, 20, and 21; and equation 4).

Re **claim 12**, Ramaswamy discloses the claimed equations for initializing virtual buffer occupancy (Ramaswamy: equations 1, 2, and 3).

Claim 15 recites the corresponding apparatus for implementing the method of claim 1, and therefore claim 15 has been analyzed and rejected with respect to claim 1 above.

Claim 16 has been analyzed and rejected with respect to claim 2 above.

Claim 18 has been analyzed and rejected with respect to claim 4 above.

Claim 19 has been analyzed and rejected with respect to claim 5 above.

Art Unit: 2621

Claim 20 has been analyzed and rejected with respect to claim 6 above.

Claim 23 has been analyzed and rejected with respect to claim 9 above.

Claim 24 has been analyzed and rejected with respect to claim 10 above.

Claim 25 has been analyzed and rejected with respect to claim 11 above.

Claim 26 has been analyzed and rejected with respect to claim 12 above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramaswamy (US 20020163966 A1).**

Re **claim 3**, although Ramaswamy does not explicitly disclose the claimed equation for the average picture size, one of ordinary skill in the art at the time of the invention would have found it obvious that the claimed equation is the most basic calculation for a picture size (number of bits) of a picture taken from a group of pictures, as is well known in the art.

Claim 17 has been analyzed and rejected with respect to claim 3 above.

Art Unit: 2621

6. Claims 7, 13, 21, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramaswamy (US 20020163966 A1) in view of Tourapis et al. (US 7280700 B2, hereinafter referred to as “Tourapis”).

Re **claim 7**, Ramaswamy does not specifically disclose the claimed expression for selecting an initial coding mode. However, Tourapis discloses an optimization technique for data compression, wherein a specific mode may be selected that jointly minimizes distortion and bitrate (Tourapis: column 11, lines 44-53) and the function incorporates a Lagrangian multiplier corresponding to either I/P frames or B frames (Tourapis: column 11, lines 54-67). Since both Ramaswamy and Tourapis relate to coding optimization, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the mode selection of Tourapis with the rate control method of Ramaswamy in order to give preference to modes with lower overhead, thus optimizing the balance between resource usage and performance (Tourapis: column 12, lines 1-6).

Re **claim 13**, arguments analogous to those presented for claim 7 are applicable to claim 13. Therefore, claim 13 has been analyzed and rejected with respect to claim 7 above.

Claim 21 has been analyzed and rejected with respect to claim 7 above.

Claim 27 has been analyzed and rejected with respect to claim 13 above.

Re **claim 29**, Ramaswamy does not specifically disclose that the rate distortion optimization is performed in accordance with JVT standards. However, Tourapis discloses that the disclosed techniques are employed for use with the JVT H.264/AVC

Art Unit: 2621

standard (Tourapis: column 6, lines 57-67). Since both Ramaswamy and Tourapis relate to coding optimization, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the techniques of Tourapis with the rate control method of Ramaswamy in order to optimize the balance between resource usage and performance (Tourapis: column 12, lines 1-6).

7. Claims 8, 14, 22, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramaswamy (US 20020163966 A1) in view of Tourapis et al. (US 7280700 B2, hereinafter referred to as “Tourapis”), and further in view of Sriram et al. (US 20030063667 A1, hereinafter referred to as “Sriram”).

Re **claim 8**, neither Ramaswamy nor Tourapis specifically discloses the claimed equation for selecting a motion vector. However, Sriram discloses a method for optimal encoding of motion compensated video, wherein motion vectors are chosen to minimize the overall coding distortion in addition to the average prediction error (Sriram: paragraphs [0059]-[0066] and equation 1). Since Ramaswamy, Tourapis, and Sriram relate to coding optimization, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the motion vector selection of Sriram with the rate control method of Ramaswamy and Tourapis in order to produce an encoded image represented in a bitstream that provides the best visual quality for the bit-rate allowed by the video coding standards (Sriram: paragraph [0010]).

Re **claim 14**, arguments analogous to those presented for claim 8 are applicable to claim 14. Therefore, claim 14 has been analyzed and rejected with respect to claim 8 above.

Claim 22 has been analyzed and rejected with respect to claim 8 above.

Claim 28 has been analyzed and rejected with respect to claim 14 above.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. Moving picture encoding apparatus and method; Katta et al. (US 6115421 A)
- b. Video signal coding method; Ryu (US 6507616 B1)
- c. Multi-hypothesis motion-compensated video image predictor; Wiegand et al. (US 6807231 B1)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER FINDLEY whose telephone number is (571)270-1199. The examiner can normally be reached on Monday-Friday (8:30 AM-5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on 571-272-7905. The fax phone

Art Unit: 2621

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/
Supervisory Patent Examiner, Art Unit 2621

/Christopher Findley/